

*Sub B7*

1       1. An eyesafe, Q-switched, laser system for target  
2 identification, ranging, and gated viewing, said laser system  
3 having a number of diodes for optical pumping, comprising: a  
4 resonant pumped erbium (RPE) laser having a storage lifetime  
5 that minimizes said number of diodes needed to pump said Er  
6 laser, said RPE laser being in band to I<sup>2</sup> devices.

1           2. The eyesafe, Q-switched laser system in accordance  
2 with claim 1, further comprising dilute concentrations of  
3 unsensitized Erbium in an approximate range between 0.1 and 2%  
4 of active ion, and having a lifetime of ~10msec for a 1.5  
5 micron transition.

1           3. The eyesafe, Q-switched laser in accordance with  
2 claim 2, further comprising an Erbium crystalline or glass  
3 host pumped by 1.5 micron diodes or diode pumped Yb-Er glass  
4 lasers.

1           4. The eyesafe, Q-switched laser system in accordance  
2 with claim 1, further comprising an energy/pulse between ~250  
3 and 300mJ.

1           5. The eyesafe, Q-switched laser system in accordance  
2 with claim 1, wherein said Erbium laser further comprises a  
3 wavelength of ~1.5 microns.

1       6. The eyesafe, Q-switched laser system in accordance  
2 with claim 2, wherein said number of diodes pump ~30 to 60W at  
3 1.5 microns wavelength for ~10ms.

1       7. An eyesafe, Q-switched, laser system or gain medium  
2 for target identification, ranging, gated viewing, and for  
3 amplifying fiber communications links, said laser comprising:  
4 a resonant pumped erbium (RPE) laser having a storage lifetime  
5 that minimizes said number of diodes needed to pump said  
6 optical parametric oscillators, said RPE laser being in band I<sup>2</sup>  
7 devices, and that permits the attainment of gain coefficients  
8 of 0.5-1cm<sup>-1</sup>.

1       8. The eyesafe, Q-switched laser system or gain medium  
2 in accordance with claim 7, further comprising dilute  
3 concentrations of unsensitized erbium in a range of ~0.1 and  
4 2% of active ion, and having a lifetime of ~10 msec for a 1.5  
5 micron transition.

1       9. The eyesafe, Q-switched laser system or gain medium  
2 in accordance with claim 8, further comprising an erbium  
3 crystalline or glass host material pumped by 1.5 micron diodes  
4 or Yb-Er glass laser.

1       10. The eyesafe, Q-switched laser system or gain medium  
2       in accordance with claim 7, further comprising an energy/pulse  
3       between ~250 and 300mJ and a gain coefficient from 0.51 cm -  
4       1cm<sup>-1</sup>.

1       11. The eyesafe, Q-switched laser system or gain medium  
2       in accordance with claim 8, wherein said erbium lasers further  
3       comprise a wavelength of ~1.5 microns.

1       12. The eyesafe, Q-switched laser system or gain medium  
2       in accordance with claim 8, wherein said diodes pump ~30 to  
3       60W at 1.5 micron wavelength for ~10ms.

1       13. An eyesafe, Q-switched, laser system or gain medium  
2       for target identification, ranging, and gated viewing, said  
3       laser system having a diode array pump source, comprising: a  
4       plurality of diodes needed to achieve high energy storage and  
5       high gain.

1       14. A gain medium suitable for amplifying the output of  
2       Er fiber lasers to achieve sufficient power for reliable free  
3       space communications links, comprising: a resonant pumped  
4       erbium laser having a storage lifetime sufficient to achieve  
5       high gain.

1       15. The gain medium in accordance with claim 14, further  
2 comprising dilute concentrations of unsensitized Erbium in an  
3 approximate range between 0.1 and 2% of active ion, and having  
4 a lifetime of ~10msec for a 1.5 micron transition.

1       16. The gain medium in accordance with claim 14, further  
2 comprising an Erbium crystalline or glass host pumped by 1.5  
3 micron diodes or diode pumped Yb-Er glass lasers.

1       17. The gain medium in accordance with claim 14, wherein  
2 said Erbium laser further comprises a wavelength of ~1.5  
3 microns.